

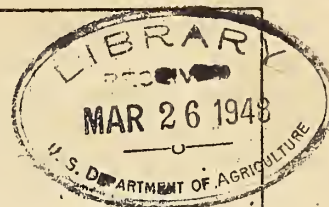
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ANGORA RABBIT WOOL PRODUCTION

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Division of Wildlife Research

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A comparatively new phase of the rabbit industry in the United States is the raising of Angora varieties for wool, which on these rabbits grow 5 to 8 inches a year and, under the commercial practice of shearing 4 times a year, attains a length of about 2-1/2 to 3-1/2 inches each quarter. From a mature animal not nursing young, about 12 ounces of wool a year may be sheared. This is valued for its softness, warmth, and strength, and may be dyed with delicate pastel colors. It is used in the manufacture of children's clothing, sport clothes, garment trimmings, and, to some extent, in clothes for general wear.

The production of Angora rabbit wool as a side line offers an opportunity for persons otherwise employed, and for those who are sufficiently experienced, the business may be developed on a commercial scale. Inexperienced persons interested in raising Angora rabbits are advised to study the business well, beginning in a small way, with three or four does and a buck and increasing the herd as experience and the market for the product dictate.

NOTE: This leaflet supersedes Wildlife Leaflet BS-55, issued in 1936, and Leaflet Bi-1292a, issued in 1939, by the Bureau of Biological Survey, under the Department of Agriculture.

Detailed drawings and bills of material for constructing rabbit hutches and their equipment are given in Conservation Bulletin 25, Rabbit Raising, a copy of which may be obtained from the Fish and Wildlife Service, Chicago 54, Illinois, or from the United States Rabbit Experiment Station, Fontana, California.

SELECTING THE TYPE OF ANGORA RABBIT

There are two types of Angora rabbits--the English and French. Choice is largely a matter of personal preference. The French Angora is usually larger than the English, and the wool fiber of the English is longer and of finer texture than that of the French.

BREEDING

Both bucks and does may be mated when they are 6 months old. Does should be mated when they are coming into maturity, as if too long delayed there may be some difficulty in getting them bred. Before mating, both doe and buck should be examined to make certain that they are free from disease.

If the doe is sheared before mating, the wool will have grown sufficiently before she kindles for her to pull enough from her body to cover up the newborn litter.

The doe should always be taken to the buck's hutch for service. Difficulties will frequently be experienced if this procedure is reversed, because the doe will likely object to the presence of another rabbit in her hutch and may savagely attack and injure the buck. Furthermore, bucks are slow in making a service in a strange hutch. For best results there should be as little confusion as possible. The doe should be handled gently, for if she is timid, undue excitement may make her nervous.

For each 10 breeding does, 1 buck should be maintained. Mature, vigorous bucks may be used 2 or 3 times a week during short periods of time. A breeding record should be kept showing the date of mating and the names or numbers of the buck and doe.

COLONY SYSTEM

The herd bucks and does should be kept in individual hutches, but to save labor in feeding and caring for the "woolers," that is, the does and castrated bucks maintained primarily for wool production, these may be kept in groups or colonies. To prevent infestation of internal parasites and to keep the wool clean, the pens should have self-cleaning floors.

To prevent fighting among the rabbits, the bucks that are to be reserved for woolers should be castrated when weaned (at 2 months of age) or shortly after.

CASTRATION

Castration of a buck is a simple operation, especially for one experienced with domestic farm animals. It may be done when the animal is weaned at 8 weeks of age, but is much easier to perform with older bucks.

To restrain an animal properly for the operation, an assistant should hold the left forefoot and left hind foot with his left hand and the right forefoot and right hind foot with his right hand, with the animal's back held firmly, but gently, against his lap. Clip all the wool on the scrotum. Disinfect a sharp knife or razor blade. Do not use a disinfecting agent on the rabbit, for if one is not used the animal will lick the wound frequently, thereby keeping it clean and the tissues soft, thus causing rapid healing.

Press one of the testicles down into the scrotum and hold it firmly between thumb and forefinger of left hand. Make the incision parallel to the median line and well toward the back end of the scrotum to allow wound to drain readily. To prevent its being drawn up into the abdominal cavity, as soon as it comes through the incision, pull the testicle out far enough from the body for the cord to be severed just above the organ. If too much tension is put on the cord and it is drawn too far from the body, injury may be brought about by internal hemorrhage or other complication. To prevent excessive hemorrhage, sever the cord by scraping with the knife, rather than cutting.

After the second testicle has been removed, lift the scrotum to insure that the ends of the cord go back into the cavity.

Handle the animal gently, and immediately following the operation, place it in a clean hutch where it can be quiet and comfortable.

SELECTING FEEDS

Locally grown grains and leguminous hays may be used in the ration. The choice of grains for a grain and protein mixture will depend on the quality of available stocks and the cost per pound. One or more of the cereals, properly balanced with a plant-protein supplement, will produce a satisfactory food mixture for a herd of Angoras. Oats, wheat, barley, and the grain sorghums, if plump and sound, are similar in nutritive value and if of equal quality may be used in rations interchangeably, pound for pound.

The plant-protein supplements, pea-sized oil cake or the pelleted form of peanut, soybean, or linseed meals, are rich in protein (35 to 44 percent) and are desirable for hand-feeding and self-feeding with whole grains. Proprietary pelleted rations do not contain a sufficient quantity of protein to permit their use as substitutes. If the pea-sized oil cake or pelleted protein is not available, it will be necessary to feed the protein as meal and to grind or crush at least half the grains used to make the mixture adhere. The whole should be dampened slightly just before feeding to prevent waste by the meal settling out in the feed trough. The plant-protein supplement should be fresh, as indicated by a nutty odor and flavor. Legume hays should be leafy, free of stem, pea green in color, and free from mold or dust.

Green feeds, as lawn clippings, rape, cabbage, kale, palatable weeds, waste from garden vegetables, dandelions, small limbs from trimmed fruit trees, green cereal or legume crops, sweetpotato vines, and similar materials are palatable and useful feeds. Root crops, as carrots, sweetpotatoes, mangels, turnips, and beets may be used when green feeds are not available. All should be fresh and sound.

FEEDING PREGNANT DOES, HERD BUCKS, DEVELOPING YOUNG, AND WOOLERS •

The quantity of feed for the pregnant doe, developing young, herd bucks, and woolers should be so regulated that the animals will be in proper physical condition. Because of the wool covering, it is necessary to handle the Angoras to determine how much flesh they are carrying. This may be determined by noting the condition of flesh along the backbone. If too much or too little, the quantity of feed may be reduced or increased correspondingly. Animals in proper condition should be fed 1-1/2 to 2 ounces daily of one of the grain protein mixtures given on page 5 or as much as they will consume in 15 to 20 minutes.

Leguminous hay of good quality, salt, and fresh water should be kept before the rabbits at all times.

Green feeds or root crops may be fed at the rate of 1 ounce daily to begin with and, if such material is economical to feed, the quantity may be gradually increased to what will be consumed daily without waste.

Grain and Protein Mixtures for Pregnant Does, Herd Bucks,
Developing Young, and Woolers

Northwestern States

Grain and protein: 1/
2 parts whole oats or wheat
2 parts whole barley
1 part linseed, soybean, or
peanut meal 2/

Roughage:
Sweetclover or alfalfa hay
Green feed or root crops

Salt.

Northeastern States

Grain and protein: 1/
2 parts whole oats
2 parts whole wheat or
barley
1 part linseed or soybean
meal 2/

Roughage:
Clover or alfalfa hay
Green feed or root crops

Salt.

Central States

Grain and protein: 1/
2 parts whole oats or barley
2 parts whole wheat
1 part soybean or linseed meal 2/

Roughage:
Alfalfa, clover, or soybean hay
Green feed or root crops

Salt.

Southwestern States

Grain and protein: 1/
1-1/3 parts whole barley
1-1/3 parts whole milo, negari,
feterita, or kafir
1-1/3 parts whole wheat or oats
1 part soybean, peanut, or lin-
seed meal, 2/

Roughage:
Alfalfa hay
Green feed or root crops

Salt.

Southeastern States

Grain and protein: 1/
1-1/3 parts whole oats
1-1/3 parts whole wheat
1-1/3 parts whole milo,
sagrain, or barley.
1 part peanut, soybean or
linseed meal. 2/

Roughage:
Vetch, lespedeza, kudzu,
or soybean hay.
Green feed or root crops.

Salt.

- 1/ Grain and protein mixture—all parts by weight.
2/ Either in pea-sized oil cake or pelleted form.

KINDLING

The gestation period is normally 31 or 32 days. A box with enough straw to make a nest should be placed in the hutch 27 days after the doe has been mated. She should be undisturbed and made as comfortable as possible. A day or two before kindling the doe usually consumes less feed than usual. Small quantities of green feed are tempting to the appetite at this time and have a beneficial effect on the digestive system. After kindling, the doe may be restless and should not be disturbed until she has quieted down. The litter should be reduced, or built up, to 4 to 6 by the time the young are 2 days old. The number left in the litter depends on the ability of the individual doe to care for them.

FEEDING DOE AND LITTER

The day the doe kindles she may have all of any one of the grain and protein mixtures (p. 7) that she will readily consume without waste, and she should be given a greater quantity as her capacity, and that of the litter, increases. Table 1 below gives a schedule for determining the approximate quantity of a grain and protein mixture that an Angora doe and her litter will consume. For example, a 6 to 7 pound doe and litter of 6 should be fed during the sixth week following kindling 10.5 ounces of the grain and protein mixture daily--3 ounces for the doe and 1.25 ounces for each of the 6 young.

TABLE 1.—Quantity of a mixture of grain and protein to be fed daily to an Angora doe and litter

Week following kindling	Grain and protein to be fed to—	
	Doe	Each of the young
	Ounces	Ounces
First.	3.0 to 3.5	. .
Second	3.0 to 3.5	. .
Third.	3.0 to 4.0	. .
Fourth	3.0 to 4.0	0.50
Fifth.	3.0 to 4.0	1.00
Sixth.	3.0 to 4.0	1.25
Seventh.	3.0 to 4.0	1.50
Eighth	3.0 to 4.0	1.75

Grain and Protein Mixtures for Doe During Lactation

Northwestern States

Grain and protein: $\frac{3}{4}$
2 parts whole oats or wheat
2 parts whole barley
2 parts linseed, soybean, or
peanut meal. $\frac{4}{4}$

Roughage:

Sweetclover or alfalfa hay
Green feed or root crops

Salt.

Northeastern States

Grain and protein: $\frac{3}{4}$
2 parts whole oats
2 parts whole wheat or
barley
2 parts linseed or soy-
bean meal. $\frac{4}{4}$

Roughage:

Clover or alfalfa hay
Green feed or root crops

Salt.

Central States

Grain and protein: $\frac{3}{4}$
2 parts whole oats or barley
2 parts whole wheat
2 parts soybean or linseed
meal. $\frac{4}{4}$

Roughage:

Alfalfa, clover, or soybean
hay.

Green feed or root crops.

Salt.

Southwestern States

Grain and protein: $\frac{3}{4}$
1- $\frac{1}{3}$ parts whole barley
1- $\frac{1}{3}$ parts whole milo, hegari,
feterita, or kafir.
1- $\frac{1}{3}$ parts whole wheat or oats
2 parts soybean, peanut, or lin-
seed meal. $\frac{4}{4}$

Roughage:

Alfalfa hay
Green feed or root crops

Salt.

Southeastern States

Grain and protein: $\frac{3}{4}$
1- $\frac{1}{3}$ parts whole oats
1- $\frac{1}{3}$ parts whole wheat
1- $\frac{1}{3}$ parts whole milo,
sagrain, or barley.
2 parts peanut, soybean,
or linseed meal. $\frac{4}{4}$

Roughage:

Vetch, lespedeza,
kudzu, or soybean
hay.

Green feed or root
crops.

Salt.

-
- $\frac{3}{4}$ Grain and protein mixture--all parts by weight.
 $\frac{4}{4}$ Either in pea-sized cake or pelleted form.

A doe and litter should at all times have free access to leguminous hay of good quality, salt, and fresh water. When green feeds or root crops are available and are economical to use, the doe may be fed 1 ounce daily until the litter comes out of the nest box; then she should be fed a gradually increased quantity as the litter develops. These bulky feeds, which contain much moisture, should be used to supplement the grain, protein, and hay rations and not to replace them.

A properly constructed manger for the hay and green feed will protect the wool from foreign matter and prevent the feed from becoming contaminated.

EQUIPMENT FOR GROOMING AND SHEARING

The following equipment is necessary for grooming and shearing:

A table, waist high, with a top 12 by 24 inches covered with carpet or feed sack to prevent the rabbit from slipping, and equipped with castors to allow it to be turned easily.

A brush, sold as a "hairbrush," with single steel bristles set in rubber, for brushing and removing foreign material from the wool.

A pair of sharp barber's scissors.

A ruler for measuring the length of the wool.

Containers for grading and storing the wool.

GROOMING

Commercial woolers require little, if any, grooming between shearing periods, provided the rabbits are properly cared for and the shearing is done every 10 to 12 weeks. If the coat is allowed to grow for a longer period, the fibers are likely to become webbed or slightly tangled, or to form mats.

For grooming, place the rabbit on the table, part the wool down the middle of the back, and brush one side, making the strokes downward and, as the end of the wool is reached, upward and outward to remove all foreign material. Make another part in the wool about half an inch farther down the side and repeat the operation until the job is completed. Groom the other side in like manner.

For grooming the head, front legs, and belly, place the rabbit on its back in the operator's lap with the hind quarters held gently but firmly between the knees. Separate small areas of the wool and groom as for the sides.

For grooming the hind legs, the rabbit is placed on its back in the operator's lap with the head and front feet under his left arm. The left hand is used to hold the hind legs.

All stained ends of wool should be cut off before shearing.

SHEARING THE WOOL

Young rabbits are sheared at 3 weeks of age and every 10 to 12 weeks thereafter. The rabbit should be handled gently and quietly. When shearing, place the back of the scissors against the rabbit's body to prevent cutting the skin. Beginning at the rump, shear a strip about half an inch wide to the neck and repeat this operation until all the wool is removed from one side. The rabbit is then turned around and the shearing operation is repeated on the other side, starting at the neck and shearing toward the rump.

For shearing the head, front legs, belly, and hind legs, the rabbit should be restrained as for grooming and the wool from these areas removed, care being taken to avoid injuring the doe's teats.

Shearing by an experienced person will require 10 to 15 minutes. After shearing, give the rabbit a light brushing to straighten out the fibers and prevent mats forming with the new growth.

During cold weather the newly sheared rabbit will need protection. A nest box placed in the hutch will give adequate protection during cool spells but when the temperature is as low as 30° to 40° F. it will be necessary to keep the animal in a building where comfortable temperatures can be maintained. In winter, half an inch of wool left on the body aids in protecting the rabbit.

GRADING, PREPARING, AND MARKETING THE WOOL

A container for each grade should be placed near the shearing table and the wool may be graded as sheared. Following are the commercial grades:

No. 1--Pure white, absolutely clean wool, free of all mats and foreign matter; staple length, 2-1/4 to 3 inches.

No. 2--Pure white, absolutely clean wool, free of all mats and foreign matter; staple length, 1-1/2 to 2 inches.

No. 3--Pure white, absolutely clean wool, free of all mats and foreign matter; staple length, 1 to 1-1/2 inches.

"Shorts"--Pure white and absolutely clean, but may contain slightly webbed wool.

No. 4--Pure white, clean, matted wool.

No. 5--All stained and unclear wool, matted or unmatted.

In preparing wool for shipment, put each grade in a separate paper bag. One about 12 inches high will hold 1 pound without packing too tightly. The bags are then tied and placed in burlap sacks or corrugated boxes for shipment by parcel post, express, or freight.

If the wool is to be stored, mothballs or crystals in cloth sacks should be placed with it in tightly covered containers.

MARKETING AGENCIES

Some Angora breeders like to spin the wool and knit the yarn into garments for home use or for sale. Spinning can be done on an old-fashioned spinning wheel. Others prefer to market the wool to organizations or individuals who are in a position to collect quantities large enough to sell to the mills. Some of the organizations and individuals from whom information on selling wool may be obtained are listed below, but inclusion of names is no guarantee of reliability. Certain dealers sell raw wool on a commission basis or exchange Angora rabbit yarn for it. Those marked with a star (*) deal only in the wool.

American Angora Rabbit Breeders Cooperative, C. W. Orr, Secretary, Palmer Lake, Colorado.

*Precht, Hayes & Company, 246 Summer Street, Boston, Massachusetts.

California Angora Wool Growers, Inc., William H. Webb, Secretary, 6724 South Broadway, Los Angeles, California.

W. F. Dodge, 5201 South Eye Street, Tacoma, Washington.

Falls Yarn Mills, A. W. Cavedon, Secretary, Woonsocket, Rhode Island.

Federation of American Angora Breeders, H. John Harder, Secretary, P. O. Box 667, Salem, Oregon.

Gilcrest Angora Center, A. T. Gilbert, President, Foxon Road, East Haven 12, Connecticut.

*Lawrence J. Johnson, 200 Summer Street, Boston, Massachusetts.

Monarch Mills, Inc., 1223 West 6th Street, Cleveland, Ohio.

S. Rosenfelder & Son, Inc., 127 West 27th Street, New York, N. Y.

Stephens Denver Fur Auction Company, 4677 Lafayette Street, Denver, Colo.

Wool Supply Company, R. D. Route 11, Box 352, Portland, Oregon.